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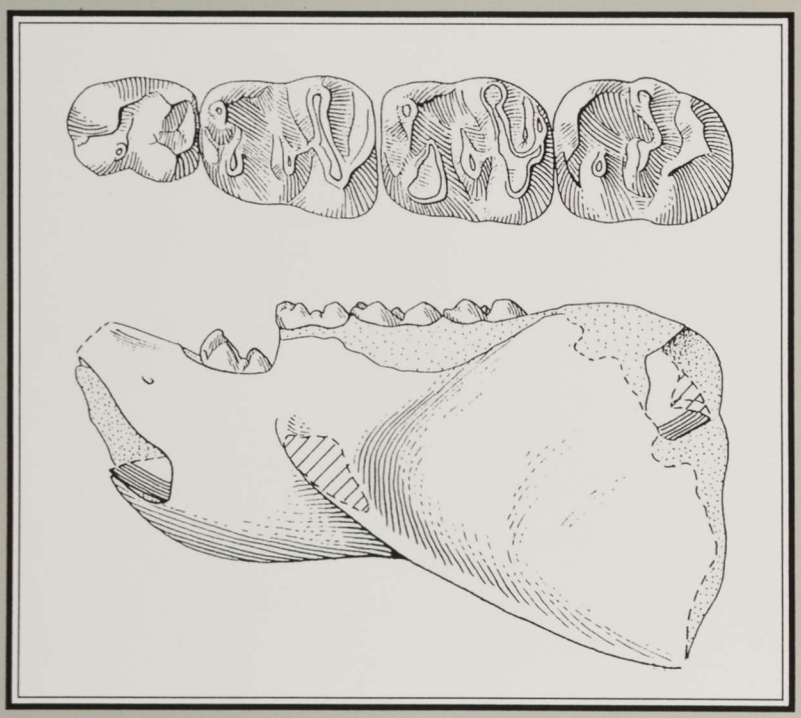
PROLAPSUS, A LARGE SCIURAVID RODENT

AND NEW EOMYIDS FROM THE LATE EOCENE OF TRANS-PECOS TEXAS

John Andrew Wilson
and
Anthony C. Runkel



September 5, 1991
TEXAS MEMORIAL MUSEUM, THE UNIVERSITY OF TEXAS AT AUSTIN

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CONTENTS

Text 1
Illustrations 15
Tables 19
References 28

John Andrew Wilson
Vertebrate Paleontology Laboratory
Texas Memorial Museum
The University of Texas at Austin
10100 Burnet Road
Austin, Texas 78758

Anthony C. Runkel
2300 Howard Street, NE
Minneapolis, Minnesota 55418

The Pearce-Sellards Series is an occasional, miscellaneous series of brief reports of Museum and Museum associated field investigations and other research. All manuscripts are subjected to extramural peer review before being accepted. The series title commemorates the first two directors of the Texas Memorial Museum: Dr. J. E. Pearce, Professor of Anthropology, The University of Texas at Austin, and Dr. E. H. Sellards, Professsor of Geology, The University of Texas at Austin. Both professors are now deceased.

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ABSTRACT

The questionably hystricognathous and hystricomorphous rodent *Prolapsus* is assigned, on the basis of its dental characters, to the Family Sciuravidae. The complete dentition of *Prolapsus sibilatoris* is now known but *P. junctionis* is still represented by isolated teeth only. *Prolapsus* sp. of Wood (1973) is now identified as a species of *Pauromys*. *Prolapsus* is found in the early Uintan (Uinta B) Whistler Squat local fauna and late Uintan (Uinta C) Serendipity local fauna at several localities in Trans-Pecos Texas and is closely related to a new eomyid genus, *Aguafriamys*, here described, that occurs in sediments of Duchesnean age in the same area. If *Prolapsus* is interpreted as being truly hystricognathous it follows that this character has evolved more than once. A new species of *Yoderimys* is described from the Coffee Cup local fauna of Chadronian age.

INTRODUCTION

Wood (1972, 1973) reported the discovery of, and described in detail, the Eocene rodent *Prolapsus*, from sediments then assigned to the Pruett Formation but now included in the Devil's Graveyard Formation (Stevens et al., 1984) of Brewster County, Texas. Wood (1973) recognized that the teeth of *Prolapsus* strongly resembled those of members of the Family Sciuravidae but did not assign *Prolapsus* to that family because of the fully hystricognathous character of the mandible. Later, without including *Prolapsus* in a family, Wood (1975, p. 78-79) included the genus in the new infraorder Franimorpha along with other North American hystricognaths and later (Wood 1977, 1981) stated that a newly discovered skull (TMM 41672-11) was hystricomorphous.

Since 1973, the *Prolapsus* sample has more than doubled and now includes two partial skulls, several more lower jaws (figs. 1-3) and many isolated teeth. One of the partial skulls, TMM 41672-11 is being studied by Dr. A. E. Wood and is the one referred to by Korth (1984:7). This paper will only refer to TMM 41672-11 for purposes of discussing the dentition so as not to interfere with Wood's study of the morphology of the skull. We will mention, however, that the infraorbital foramen on the right side of the skull fragment of TMM 41672-11 (fig. 2A) is incomplete on the dorsal margin, but as prepared, and judging from the ventral and lateral edges of the foramen, its diameter was about the size of M^1. Following the suggestion of Ferrusquia-Villafranca (1989) this would be considered a small infraorbital foramen. However, the process of the maxillary that forms the external margin of the infraorbital foramen is very thin and similar to that found in the chinchilla. It is much larger than the infraorbital foramen in the cylindrodonts *Pseudocylindrodon texanus* and *Ardynomys occidentalis* from the early Chadronian of the Vieja area.

The *Prolapsus* material that was available to Wood (1973) was collected from the basal Tertiary conglomerate marker bed (localities TMM 41444 and 41443) and the Whistler Squat quarry (41372). Their stratigraphic positions in the Devil's Graveyard Formation are shown in Stevens et al. (1984:figs. 5, 6). The faunas from these three localities were combined by Wilson (1984) to form the Whistler Squat local fauna and are associated with a tuff that has yielded a date of 46.9 ± 1.0 Ma (Henry et al., 1986:23). Two *Prolapsus*

teeth (42953-6, *P. sibilatoris* and 42953-7, *P. junctionis*) collected from the basal Big Yellow Sandstone Member, Canoe Formation, in the Tornillo Flat area of Big Bend National Park are associated with a fauna that correlates most closely with the Whistler Squat local fauna (Runkel, 1988). In addition, Runkel (1988) reported on a locality on the northeast flank of Dogie Mountain from which a number of *Prolapsus* teeth were recovered. This locality is directly beneath an ash dated at 46.29 ± 0.04 Ma by the A 40/39 method at the University of California Geochronology Center.

Isolated *Prolapsus* teeth from the Serendipity locality (41745) and isolated teeth and skull and jaw fragments from the Purple Bench locality (41672) are additions made subsequent to Wood's 1973 paper. These localities are combined to form the Serendipity local fauna and lie between rocks dated at 43.9 ± 0.7 and 42.7 ± 1.6 Ma (Wilson, J. A., 1986:360). The Serendipity local fauna was assigned an age of late Uintan (Uinta C) by Wilson (1986).

The new material allows us to reidentify two upper P^4s, 41372-278 and -297, assigned by Wood to *Prolapsus sibilatoris* (1973:figs. 7A, B) as belonging to a new undescribed genus and species and not to *Prolapsus*. Also newly known since that paper is the M^3 of *Prolapsus junctionis*. Furthermore, a large number of isolated teeth of Wood's (1973) *Prolapsus* sp., the very small form, have been restudied by Walton (1986) and are now identified as *Pauromys*. Two new lower jaw fragments are of eomyids, one of which seems to be related to *Prolapsus*.

Abbreviations - All specimens of *Prolapsus* are currently found in the collections of the Texas Memorial Museum (TMM). Specimen numbers without prefixes belong to TMM; such numbers preceded by a hyphen are abbreviated, and include the five digit locality number preceding, e.g., 41372-1, -2. Detailed descriptions of localities are on file at the Vertebrate Paleontology Laboratory, Balcones Research Center, 10100 Burnet Rd., Austin, Texas 78758-4497.

CM	Carnegie Museum, Pittsburgh
FMNH	Field Museum of Natural History, Chicago
SDSM	South Dakota School of Mines and Technology

Family Sciuravidae Miller and Gidley, 1918

Prolapsus Wood, 1973

Genotype - *Prolapsus sibilatoris* Wood, 1973

Referred species - *P. junctionis* Wood, 1973

Emended Diagnosis [modified from Wood (1973)] - Dental formula I $^{1}/_{1}$, C $^{0}/_{0}$, P $^{2}/_{1}$, M $^{3}/_{3}$. Questionably hystricognathous with angle arising entirely laterad of incisive alveolus; lower premolar smaller than molars; lower cheek teeth with transversely elongate mesoconid that may be single, double, or lophate; molar metalophid extending from protoconid to rear surface of metaconid, closing rear of trigonid basin; anterior cingulum with very small anteroconid or without anteroconid, usually a forward opening of trigonid basin at one or both ends of anterior cingulum; lower teeth with partial or complete crests from entoconid toward hypoconid, with a cusp-like enlargement in the center of the crest on some teeth; posterolophid reaching to or nearly to entoconid, hypoconulids present or absent; P^3 is a simple peg, P^4 with or without a hypocone; M^1 and M^2 quadrate, M^3 subtriangular; M^1 and M^2 with large and distinct hypocone, M^3 with hypocone close to protocone; protoloph usually complete after moderate wear; anterior cingulum large with or without protostyle; anterior arm of hypocone on M^1 and M^2 widely separate from protocone and protoloph and continuous into central basin, almost to paracone, forming a pseudomesoloph; single or multiple metaconules connecting with hypocone in varying manners; strong posterior cingulum; prominent mesostyle or mesostyles; lower cheek teeth with two roots, one anterior and one posterior; upper cheek teeth with one lingual and two buccal roots; upper and lower incisors with flat anterior face, enamel extending well onto lateral side; incisor enamel uncertain*.

Distribution. - Uinta B and C, middle Eocene, Devil's Graveyard and Canoe Formations, Big Bend region of Texas.

Prolapsus sibilatoris Wood, 1973

Figures 1-5, Tables 1-4.

Type. - TMM 41372-179, right lower jaw with M_{1-3}, the alveolus of P_4, a broken incisor, and a broken angular process.

Material. - 41372-778 (Wood's -241C), I_1; -299, LP_4; -284, LM_1; -291, RM_1; -266, RM_2; -143, LM_3; -265, RM_3; -269, RM_3; -381, RM_3; 41672-8, LP_4-M_1; -9, RM_1-M_2; -14, RM_1; -15, LM_2; -85 RM_1, M_3; -86, RM_1; -106, left lower jaw fragment with P_4-M_3; -198, left lower jaw fragment with P_4-M_2; 41745-84, LP_4; -58, RM_1 or M_2; -89, LM_1 or M_2; -142, LM_1 or M_2; -272, RM_1; -278, LM_1 or M_2; -307, LM_1 or M_2; -308, LM_1 or M_2; -309, LM_1 or M_2; -310, LM_1 or M_2; -311, RM_1 or M_2; -314, RM_1 or M_2; -315, LM_1 or M_2; -317, LM_1 or M_2; -318, LM_1 or M_2; -319, RM_1 or M_2; -316, RM_3; -371, RM_3; -377, RM_3; -378, LM_3; -379, LM_3; -380, RM_3;

* Wood (1973, p. 22, 27) identified the incisor enamel as pauciserial. In 1985 (p. 481, 482) he described it as "condition intermediate between pauciserial and multiserial." Thomas Martin, Universität Bonn, Germany (personal communication), October 11, 1990 stated that *Prolapsus* has pauciserial enamel.

41372-782 (Wood's -241G), RI^1; -256, LM^1; -262, RM^1; -285, RM^1; -300, LM^1; 252, RM^2; -263, LM^2; -295, RM^2; -304, LM^2; 41672-3, skull fragment with RP^4-M^1, LP^3, alveolus of P^4-M^1, lingual half of M$^{2-3}$; -11, skull fragment with RLI, RP^3-M^2; -93, RM^1-M^2; 41443-70, LM^1 or M^2; 41745-40, RP^4; -31, RM^1 or M^2; -60, RM^1 or M^2; -134, RM^1 or M^2; -147, LM^1 or M^2; -282, RM^1 or M^2; -283, RM^1 or M^2; -284, RM^1 or M^2; -285, RM^1 or M^2; -286, RM^1 or M^2; -289, LM^1 or M^2; -290, LM^1 or M^2; -292, LM^1 or M^2; -294, LM^1 or M^2; -295, RM^1 or M^2; -297, RM^1 or M^2; -298, RM^1 or M^2; -299, LM^1 or M^2; -300, LM^1 or M^2; -301, LM^1 or M^2; -302 LM^1 or M^2; -303, LM^1 or M^2; -305, LM^3; 41549-3, RM^3; 42953-6, LM^1 or M^2.

Stratigraphic position. - Lower member of the Devil's Graveyard Formation, basal Tertiary conglomerate (41443), Whistler Squat quarry (41372), Agua Fria area; Hannold Draw area, Big Yellow Sandstone Member, Canoe Formation, Crusher Section, Big Bend National Park (42953). Middle member Devil's Graveyard Formation, Purple Bench locality (41672), Serendipity locality (41745), Margaret's Bonebed (41549), Agua Fria area.

Description. - The mesoconids on *P. sibilatoris* from the Serendipity and Purple Bench localities show more variability than those from the Whistler Squat quarry. From the former localities it is usually a single but lophate crest with only three out of 24 specimens showing double cusps. The lophate mesoconid may show a short and weak connection with the protoconid; it may also have a short, weak connection with the hypoconid or the hypolophid, or it may not connect with any other cusp. On the M_3 the mesoconid connects with the entoconid on three specimens and does not connect with the entoconid on three others. Of seventeen isolated lower first or second molars from Serendipity locality, 12 have a complete hypolophid with no hypoconulid, two have a very small hypoconulid on complete hypolophids, two have incomplete hypolophids with no hypoconulids, and one has a complete hypolophid with a hypoconulid. Obviously, the above characters are variable within a sample from one locality. The hypoconulid is rare on specimens from the Serendipity locality. The connection of the crest from the entoconid to the mesoconid is present in three of 24 teeth from the Serendipity and Purple Bench localities.

The type lower jaw, 41372-179, does not have a P_4. Wood (1973) used a P_4 of *P. junctionis* (41444-1) and a fragment of a P_4 of *P. sibilatoris* (41372-299) for the basis of his description. An unerupted P_4 is present on 41672-106 (fig. 1) and a fully erupted one on -198. There is an anterior cingulum on the *P. junctionis* P_4 (41444-1) but there is only a very short anterior cingulum and an anteroconid on each of the same teeth at the Purple Bench and Serendipity level. A hypoconulid is present on 41672-106; otherwise, the description of Wood (1973:24-25) is applicable to *P. sibilatoris*.

A P^3 is present on 41672-11 (figs. 2A, B, C) and is represented by alveoli on 41672-3 (fig. 3). It is safe to assume that skulls of *Prolapsus* in the earlier Whistler Squat local fauna would also have P^3, although none is presently known.

It must be pointed out that in figure 8 of Wood (1973) the explanation for "F" was inadvertently omitted and should read: F. LP^4, 41444-26. Also in the same figure, H. 41443-30 is not a LM^3 of *Prolapsus junctionis*, but is from the same undescribed rodent as the P^4 in figure 7.

On 41672-3 the internal portions of M^2 and M^3 are preserved. Although the M^3 is worn, there is still a prominent anterior cingulum that ends lingually opposite the middle of the protocone. In the undescribed rodent 41443-30 the anterior cingulum continues to the anterointernal corner of the tooth. On the M^3 of *Prolapsus* the protocone is separated from the hypocone by a median valley, as in M^1 and M^2, and is still present on the worn tooth. The hypocone is a prominent cusp. An isolated M^3, 41745-305, is referred to *P. sibilatoris* and is the basis for the following description.

The M^3 of *P. sibilatoris* has a prominent anterior cingulum that has its lingual end at the anterobuccal corner of the protocone. The protocone is larger than the hypocone and separated from it by a prominent valley. The internal valley is also present on 41672-3 where only the internal half of M^3 is preserved. The protoloph is complete in 41745-305 but this is a slightly worn tooth so it is not possible to distinguish a protoconule. The metacone is small compared to the paracone. A short loph extends from the position of the metaconule to the posterior cingulum enclosing a posterolingual basin. Specimen 41745-305 does not have nearly as complicated a pattern as 41443-30 that was identified as the M^3 of *Prolapsus* by Wood (1973:fig. 8H).

Prolapsus junctionis
Figures 4, 5, Tables 5-8.

Type. - TMM 41444-62, isolated RM_1.

Material. - TMM 41444-1, RP_4; -116, LM_1; -59, LM_2; -61, LM_3; 75, LM_3; 41443-363, RP_4; -433, LP_4; -33, LM_1; -68, RM_1; -71, LM_1; -75, RM_1; -141, RM_1; -222, RM_1; -371, RM_1; -381, RM_1; -417, RM_1; -491, RM_2; -496, RM_2; -507, RM_2; -557, RM_2; -566, LM_2; 41745 -471, LM_1; -472, LM_1; -277, LM_2; -322, LM_2; -273, LM_3; -276, LM_3; -279, LM_3; -280, LM_3; 42952-103, RP_4; -82, LM_1; -83, LM_1; -81, RM_1 or M_2; -80, RM_1 or M_2; 41444-187 (Wood's -56B), LI^1; -26, LP^4; -69, LM^1 or M^2; -104, LM^1; -115, LM^1; -25, RM^2; -164, RM^2; -168, LM^2; 41443-545, RdP^4; -560, LdP^4; -66, LM^1; -434, RM^1 or M^2; -529, RM^1 or M^2; -54, LM^2; -65, RM^2; -73, LM^2; -74, LM^2; -78, LM^2; -215, RM^2; -324, RM^2; -396, RM^2; -542, RM^2; -445, RM^3; 41745-72, LM^1; -136, LM^1 or M^2; -269, LM^1; -270, RM^1; -110, LM^2; -266, LM^2; -267, LM^2; -366, LM^3; 42952-67, LM^1; -68, LM^1; -69, RM^1; -70, RM^1; -73, LM^1 or M^2; -74, RM^1 or M^2; -71, LM^2; -72, RM^2; 42953-7, RM^1 or M^2.

Stratigraphic position. - Lower member of the Devil's Graveyard Formation, basal Tertiary conglomerate (41443, 41444), Agua Fria area; Dogie Mountain (42952); middle member of the Devil's Graveyard Formation, Serendipity locality (41745), Agua Fria area.

Emended diagnosis. - Smaller than *P. sibilatoris*. Mesoconid prominent and lophate; hypolophid extends toward hypoconid in earlier members of species and connects in Serendipity members; entoconid may connect to posterolophid; pseudomesoloph extends from the hypocone to near the center of the upper molars, mesostyle small; protostyle not a distinct cusp.

Description. - Size is the main distinction between *P. sibilatoris* and *P. junctionis*. The scatter diagrams in figures 4 and 5 imply that there are two distinct populations. There is no apparent change in size within either the large or the small group upward in the section. However, *P. junctionis* is much more abundant in the basal Tertiary conglomerate; only a single tooth, 41443-70 LM^1 or M^2, is identified as *P. sibilatoris*. The latter occurs only at the Whistler Squat quarry level.

The two species are not as distinct morphologically at the Whistler Squat level as implied by Wood (1973), who described *Prolapsus sibilatoris*, the larger species, as having well developed mesoconids, complete or nearly complete hypolophids, complexities in the upper cheek teeth and a well developed pseudomesoloph.

According to Wood (1973), the smaller species, *P. junctionis*, has mesoconids that extend less than half-way across the lower teeth, hypolophids that are never complete, and entoconids that may connect to the posterolophid. The pseudomesoloph is broadly interrupted in the center of the upper molars, the mesostyle is small, and the protostyle is a distinct cusp. Additional differences noted in this study are that the mesoconid in *P. sibilatoris* usually occurs as two slightly separated cusps that connect with wear, while the mesoconid of *P. junctionis* is either a single cusp or, more commonly, a complete loph. In addition, some specimens of *P. sibilatoris* have a small cusp partially separated from, and located immediately lingual to, the metacone.

Although these character distinctions are valid in general, they are not consistently present in the sample. The morphologic similarities between these two species are more readily apparent than the differences, and a comparison of M_2 in the types of *P. sibilatoris* (TMM 41372-179) and *P. junctionis* (TMM 41444-59) demonstrates that some of these specimens are nearly identical. The mesoconid does in fact extend further than half the width of the lower molars in some specimens of *P. junctionis* (e.g., LM_2 TMM 41444-59). The mesoconid of *P. junctionis* in TMM 41443-557 (RM_2) extends to nearly one half the length of the tooth, and the hypoconulid is complete, although it narrows and shallows as it approaches the entoconid; this condition is seen in most of the *P. sibilatoris* specimens as well. The hypolophid is no more complete on *P. sibilatoris* M_2 (e.g., TMM 41372-179 and TMM 41372-266) than is the hypolophid of that tooth in most specimens of *P. junctionis*.

The M^2 of *P. sibilatoris* (TMM 41372-295) and *P. junctionis* (TMM 41444-168) also shows the similarities between the two species. The mesostyle is not consistently larger in *P. sibilatoris* specimens. The extension of the pseudomesoloph and the prominence of the protostyle are highly variable in both species.

Although the size bimodality (figs. 4 and 5) remains distinct, specimens from higher in the section display subtle changes in the tooth morphology of both species that result in an even greater similarity between *P. sibilatoris* and *P. junctionis*. In the upper molars of both species the pseudomesoloph, extending from the hypocone, is more pronounced and extends further toward the central part of the tooth. The mesostyle is generally absent or quite small; the protoloph is better developed, and fully or nearly connected to the paracone; the anteroloph is reduced, and the posteroloph and pseudomesoloph are more

pronounced and fully connected to the hypocone, forming a selene in the posterior lingual portion of the tooth.

In the lower molars the mesoconid more commonly exists as a single cone in the earlier *Prolapsus* sample. It is positioned more lingually toward the center of the tooth and rarely connects with the hypoconid. The hypolophid becomes more pronounced in the later forms, and more fully connected to both the hypoconid and entoconid. The protolophid, although more pronounced, never connects with the metaconid and always lies posterior to it. The anterior cingulum of P^4 is reduced.

It must be stressed that these morphologic differences between *Prolapsus* from the higher stratigraphic levels and *Prolapsus* from the Whistler Squat level are generalities, and are not present in all specimens. Despite these changes the teeth of both species from the Serendipity level remain quite similar to those of the Whistler Squat level and are assigned to *P. sibilatoris* and *P. junctionis* principally on the basis of size. The nearly identical, though smaller, TMM 41745-266 (*P. junctionis*) from Serendipity and TMM 41372-295 (*P. sibilatoris*) from the Whistler Squat quarry locality demonstrate this similarity.

In summary, the bimodal size distribution of *Prolapsus* teeth occurs throughout its known stratigraphic occurrence, but the morphologic differences, initially subtle at the Whistler Squat level, are even more indistinct higher in the section as the tooth morphologies of the large and small species converge. However, despite the lack of major morphologic differences between the small and large species throughout the section, these two taxa should not be synonymized.

At one time it was believed that the Serendipity-Purple Bench populations might represent a new species. But with the larger sample size from both levels the only way to distinguish this new species would be to know its stratigraphic position. We were reluctant to do this even though it meant the *P. sibilatoris* and *P. junctionis* are interpreted herein to be rather variable in tooth morphology, yet conservative so far as major changes are concerned over a timespan of perhaps 3 million years.

Relationship. - *Prolapsus junctionis* and *P. sibilatoris* are closely related. The smaller size, and overall lesser degree of development of the lophs and accessory cusps of the cheek teeth, suggest that *P. junctionis* is the more primitive of the two species. The rarity of *P. sibilatoris* from the basal Tertiary conglomerate at the Agua Fria area suggests that *P. junctionis* is the earlier species. However, the environment of deposition was different at the basal Tertiary conglomerate from that at the overlying Whistler Squat quarry, so the absence of *P. sibilatoris* from the former locality could be attributed to an environmentally biased sample.

Wood (1972, 1973, 1974b, 1975, 1977, 1981, 1983, 1984, 1985) has consistently described *Prolapsus* as hystricognathous, and based primarily on this character assigned *Prolapsus* to the suborder Hystricomorpha, infraorder Franimorpha (Wood, 1975). Wood (1980:86) stated that *Prolapsus* was also hystricomorphous based on unpublished data (TMM 41672-11 on loan to Dr. Wood). In his original description of *Prolapsus,* Wood

(1973) did not classify the faunule of rodents from the Agua Fria area of West Texas above the family level; *Prolapsus* was placed in "Family Indet." In the following year Wood (1974:45) explained the dilemma as follows:

> "However, hystricognathy is clearly present in the middle Eocene genus *Prolapsus* from southwest Texas (Wood, 1972, 1973), in the late Eocene *Protoptychus* (Wahlert, 1973) and in the Eocene *Guanajuatomys* from central Mexico (Black and Stephens, 1973); it is incipiently present in other North American Eocene rodents. If hystricognathy is a diagnostic character of the Suborder Hystricognathi, these North American forms must be included, as the only demonstrable Eocene members of the suborder. If they are ruled out, hystricognathy must, as a result, be a character that has evolved several times independently in the North American Eocene and it cannot be considered a diagnostic feature of any importance until it is proven how many more times it evolved independently."

Wood (1975:78-79) proposed that:

> "Since none of the known North American Eocene hystricognaths seems to fit into the Hystricidae, Phiomorpha, or Caviomorpha (although Wahlert in 1972 tentatively placed the Protoptychidae in the Caviomorpha) a separate ancestral group is needed to receive these forms, for which I propose the term Franimorpha, new infraorder based on the name of the earliest known included genus. The Hystricognathi may then be divided into four infraorders: the African Phiomorpha, the South American Caviomorpha, the Old World Hystricomorpha, (presently restricted to the single family Hystricidae), and the Franimorpha, presently including the Reithroparamyinae, Protoptychidae, *Prolapsus* and *Guanajuatomys*, but which I believe must also have been present in the Eocene of Asia."

In 1981 and 1984 Wood included the Cylindrodontidae in the Franimorpha but did not propose a family for *Prolapsus*. Of greater importance was the problem of accepting "the postulate that hystricognathy is a valid basis for isolating one group of rodents as the Suborder Hystricognathi, *because hystricognathy is assumed to have originated only once in the evolution of the rodents*, and, therefore, all hystricognathous forms are descended from a single hystricognathous ancestor" (Wood, 1984:153).

An opposing point of view was taken by Korth (1984) who denied that *Prolapsus* was fully hystricognathous. He (1984:7) stated:

> "The type specimen of *Prolapsus sibelatoris* (sic) TMM 41372-179 is not fully (sic) hystricognathous jaw as stated by Wood (1972, 1973). The angle of the mandible of *Prolapsus* is no more laterally displaced than that of the early Eocene sciuravid *Knightomys* Gazin (1961). The mandible of *Prolapsus* is very robust and the breadth of the mandible is much greater than that of *Knightomys*, making the angle look more laterally displaced. Wood (1977, 1981) also stated that the skull of *Prolapsus* was hystricomorphous. However, the undescribed skull (TMM 41672-11) of *Prolapsus* on which Wood based his statement has been examined and compared to the skull of Bridgerian *Sciuravus*. The infraorbital foramina of these two genera are the same relative size and are clearly protrogomorphous."

In his original description of *Prolapsus* Wood (1973:31) said: "Were only the teeth of *Prolapsus* known, there would be no problem in placing it in the Sciuravidae, but the complete hystricognathy of *Prolapsus*, a feature not even hinted at in any known sciuravid, makes its allocation to the Sciuravidae impossible." Wood clearly recognized the similarity of the dental pattern of *Prolapsus* to that of the sciuravids but chose to follow a classification based on his interpretation of the lower jaw structure.

The original specimen, the type of *Prolapsus sibilatoris* (41372-179), has been examined by several experts on fossil rodents and a majority agree with Wood that it is a hystricognathous jaw. They also agree with Wood and Korth that the teeth are sciuravid. R. W. Wilson (1986:168-169) reviewed "Problems in Hystricognathy" and stated that: "Further, neither is it necessary to assume that the possession of incipient, or even fully developed, hystricognathy relates rodents to each other, and excludes relationship with others" (Wilson, 1986:168).

We believe that it is unlikely that *Prolapsus* would develop the unquestioned sciuravid premolar and molar tooth pattern in parallel with contemporary forms to the north and be unrelated to them at an infraordinal level. We also believe that the family Sciuravidae, like other middle and late Eocene rodent families, was represented in West Texas and that *Knightomys huerfanensis* is morphologically close to *Prolapsus*. Not only are the mesoconid, anterior cingula, P_4, and hypocone of P^4 very similar in both genera, but *Knightomys* and *Prolapsus* display the same degree of lateral displacement of the angular process in the lower jaws (Korth, 1984).

Family Eomyidae Depéret and Douxami, 1902

Genus *Aguafriamys* new genus

Etymology. - "Agua Fria" ranch - "mys" Gr - mouse.

Type species. - *Aguafriamys raineyi*.

Stratigraphic position. - Skyline channels, base of Bandera Mesa Member, Devil's Graveyard Formation (Stevens, et al., 1984).

Age. - Early Duchesnean, *sensu* Wilson (1984).

Diagnosis. - Larger than *Protadjidaumo*, *Viejadjidaumo*, *Aulolithomys bounites*, and *Aulolithomys* cf. *A. bounites* (Wood, 1974). Approximately the same size as *Centimanomys*, but P_4 smaller. Teeth brachydont. Anterior cingulum compressed to metalophid and protoconid with almost no trigonid basin. Metaconid prominent with transversely elongate mesolophid. Metaconid connected by mures to protoconid and hypoconid.

Aguafriamys raineyi new genus and species
Figure 6, Table 9b.

Etymology. - For Robert W. Rainey, Chief Preparator, Vertebrate Paleontology Laboratory, Texas Memorial Museum, The University of Texas at Austin, field companion and advisor to professors and students.

Type. - TMM 41580-32, right lower jaw fragment with P_4-M_2.

Stratigraphic position and age. - As for genus.

Description. - Surface weathering removed all of the bone of the lower jaw except for a small fragment below M_2. The incisor was not preserved. The crowns of P_4 and M_1 were embedded in matrix in their natural position and later cleaned. The P_4 was cracked and repaired, and the posterolingual part of the tooth is unclear. The protoconid and metaconid are close; the metaconid is higher and more anterior. The trigonid basin is almost obliterated. A small mesoconid is present and a short mesolophid extends transversely to the middle of the tooth. Mures connect the mesoconid with the protoconid and hypoconid.

The metaconid and entoconid are the highest conids on all teeth. The lophs from the protoconid and metaconid unite to form a strong transverse crest. A weaker crest is formed by lophs connecting the hypoconid and entoconid. The protolophid extends to the posterobuccal corner of the metaconid. The protolophid is broad, and together with a short metalophid almost completely fills the trigonid basin. There is only a slight indication of an anterior cingulum on the anterobuccal corner of M_1 and M_2. The protolophid passes posterior to the metalophid as in sciuravids. The hypolophid is complete. The posterior cingulum is connected to the hypocone. The mesoconid is prominent on M_1 and M_2 and a mesostylid is present but not prominent. A mesolophid extends lingually from the mesoconid toward the mesostylid, but does not reach it. There is a short buccal extension of the mesolophid from the mesoconid.

Discussion. - The molar pattern of *Aguafriamys* strongly resembles that of *Prolapsus sibilatoris* from Purple Bench. In the former the mesoconid is prominent, the mures connect with the protolophid, and the hypolophid and the mesolophid are more pronounced, but the basic pattern is essentially the same. If this is true, and our family assignments are correct, then *Aguafriamys*, an eomyid, seems to be derived from *Prolapsus*, a sciuravid. This was anticipated by Fahlbusch (1973, 1979). There is an even more striking resemblance to *Centimanomys* from the Chadronian of northeastern Colorado. The elongate pit that lies between the cingulum and the metalophid-protolophid in *Centimanomys* is not present in *Aguafriamys*. Wood (1974) described *Aulolithomys* cf. *A. bounites* from the Porvenir local fauna of the Vieja area. In this form the molars are much shorter, more nearly square, than in *Aguafriamys* and there is a prominent separate anterior cingulum. If Wilson's (1984) correlation of the stratigraphic sections from the Agua Fria area to the Porvenir area is correct, the Skyline channels would be early Duchesnean and the Porvenir local fauna late Duchesnean. Thus *Aguafriamys* would be older than *Aulolithomys* cf. *A. bounites*.

Subfamily Yoderimyinae Wood 1955

Genus *Yoderimys* Wood 1955

Yoderimys yarmeri new species

Figure 7, Table 9a.

Etymology. - For Earl Yarmer, Preparator, Vertebrate Paleontology Laboratory, Texas Memorial Museum, The University of Texas at Austin, a skillful technician.

Type. - TMM 42153-2, LP_4-M_3.

Referred material. - 42019-10, LM_1-M_3. Tentatively referred: 42019-32, articulated skull and jaws with alveolus for P^3, P^4-M^1 (worn and/or broken) I_1, P_4-M_3 (concealed by being articulated), atlas and axis.

Stratigraphic position. - Approximately 60 feet (18.3 m) above base (road level) of Bandera Mesa Member of the Devil's Graveyard Formation (Stevens et al., 1984:fig. 10), Coffee Cup local fauna (Wilson, 1986, fig. 6), Presidio County, Texas.

Age. - Chadronian.

Diagnosis. - About the same size as *Y. burkei*, which is the largest species of *Yoderimys*. P_4 longer than M_1. M_1 to M_3 wider anteriorly than posteriorly. Protoconid and metaconid on P_4 high. Trigonid basin of P_4 open anteriorly, apparently without an anteroconid. Anteroconid prominent on M_1 to M_3. Teeth brachydont, metaconid and entoconid high. P_4 has a double mesolophid, each loop pointed lingually at right angles to the midline of the tooth row. The mesolophid originates from a lophid that connects the base of the metaconid with the buccal margin of the entoconid. A hypolophid connects the hypoconid with the entoconid. Posterolophids are prominent on all teeth. The anterior cingulum closes off a trigonid basin lingually. A continuous loph zig-zags from the anterocone, only slightly buccal to the anteroposterior center of the tooth row, to the lingual base of the hypocone where it turns linguad to form the posterior cingulum. On M_1 a small mesolophid is directed toward the entoconid, on M_2 a small mesolophid forms a loop enclosing a lake at the base of the metaconid, and on M_3 the metalophid is directed toward the entoconid. With a larger sample this structure probably would be variable.

Description. - Metaconids and entoconids are high. The molar pattern is H-shaped, with connected protolophids-metalophids and hypolophids forming transverse lophs and an equally high loph passing longitudinally from the anterocone to the hypocone and the posterior cingulum. There are deep valleys between the lophids. An accessory lophid on the anterolingual side of the mesoconid is directed toward the metaconid or the hypoconid, or, as on the M_2 of the type, it forms a closed lake. On 42019-10 M_1 is too worn, the accessory lophid of M_2 is directed toward the entoconid, and on M_3 it is closed to form a loph.

The skull and lower jaws (42019-32) were tentatively identified as *Yoderimys* sp. by Wood (correspondence to J.A.W.), who skillfully prepared them from a single nodule. The alveolus for a P^3 is highly suggestive of *Yoderimys*.

Discussion. - Unfortunately, not enough of the lower jaw is preserved on either of the Texas specimens to be compared with *Y. burkei*. The measurements of the teeth, however, show that they are approximately the same size. The accessory lophs on the type of *Y. yarmeri* seem to be more elaborate than on *Y. burkei*. There are two on P_4, one directed toward the metaconid, a closed loop on M_2, and one on M_3 which is directed toward the entoconid. The teeth are longer than those of *Y. lustrorum* (see Table 9a), and the posterior cingulum reaches the posterior lingual corner of the tooth in *Y. yarmeri*.

REMARKS ON THE FAMILIES SCIURAVIDAE AND EOMYIDAE

The early history of the genera and species belonging to the family Sciuravidae was well covered by Wilson (1938) and does not need to be reviewed here. In the same article Wilson (1938:127-128) clearly described the dental characters of the genus *Sciuravus*. Since that time Wasatchian species have been referred to the genus *Knightomys* Gazin 1961 from the San Jose Formation of the San Juan Basin, New Mexico (Flanagan, 1986), and from Wyoming and Colorado. *Pauromys* sp. was identified by Korth (1984) from the Wasatchian Wind River Formation of Wyoming. The family is better known in numbers of taxa as well as number of individuals in the Bridgerian of Wyoming and particularly at Powder Wash, Utah (Dawson, 1968). Early Uintan species are known from the Uinta Basin of Utah (Dawson, 1966) and from San Diego County, California (Wilson, 1940; Lillegraven, 1977). The family is well known in the Eocene of North America but is not as well represented by skulls and jaws as one might wish.

On the basis of dental characters Wood (1973:29) stated that: "The cheek teeth of *Prolapsus* seem clearly to be of sciuravid derivation." We believe on the basis of dental characters that the cheek teeth of *Prolapsus* are sciuravid, and that *Prolapsus* should be assigned to the Family Sciuravidae. *Prolapsus* sp. of Wood (1973) was referred to the genus *Pauromys* by Walton (1986). These assignments expand the knowledge of the Family Sciuravidae and, we believe, assist in the search for the roots of the Family Eomyidae.

Storer (1987) described new material from the Duchesnean of Saskatchewan and reviewed the radiation of the Eomyidae. He reaffirmed the derivation of the Eomyidae from the Sciuravidae, with sciuravids resembling *Knightomys* of the Wasatchian, the ancestral form. In his figure 2 he divides the eomyids into three groups: the *Yoderimys* group, the "*Namatomys*" group and the *Adjidaumo-Paradjidaumo* group. The separation between the yoderimyines and other eomyids took place during the Bridgerian, and is based on his node 4 where the eomyids other than *Yoderimys* lost P^3. Dawson (1968:fig. 41) illustrated a fragment of a maxilla of *Pauromys* with the anteriormost alveolus suggesting that P^3 was absent. The same condition is found in another fragment of a maxilla of *Pauromys*, TMM 40630-34, from the Candelaria local fauna of the Vieja area. If this is correct, *Pauromys* would belong in Storer's (1987) "*Namatomys* group." We would like to point out that no upper teeth nor maxillae are known for several of the taxa Storer (1987) referred to the *Adjidaumo-Paradjidaumo* group, and therefore the presence or absence of P^3 is not known.

Prolapsus, on the other hand, retains P^3 and would therefore be along his line leading to *Yoderimys*. We would suggest, however, that his "node 2", with the characters he notes, be raised to later in the Uintan at least so far as a sciuravid-eomyid transition in Texas is concerned. In *Prolapsus* the mures from the mesolophid are variable in completeness and direction and their position is lingual rather than medial. *Aguafriamys* is more like *Prolapsus* in that the mesoconid is more buccal but the mures are complete. *Aguafriamys* is from the Skyline channels, early Duchesnean (*sensu* Wilson, 1986). Unfortunately the upper dentition of *Aguafriamys* is not known.

CONCLUSION

A reexamination of all material of *Prolapsus sibilatoris* and *P. junctionis* leads us to agree with Korth (1984) that *Prolapsus* should be included in the Family Sciuravidae on the basis of dental morphology. This assignment was considered by Wood (1973:29) but rejected because of the hystricognathous condition of the jaw fragment and the hystricomorphous condition of the skull (TMM 41672-11). Both conditions were disputed by Korth but their assessment by Wood is in progress. It can be concluded from our study that hystricognathy has occurred in *Prolapsus*, a sciuravid, and therefore has occurred more than once. The most similar earlier taxon is probably *Knightomys huerfanensis*, and the most closely related taxon is the eomyid *Aguafriamys*.

We prefer to leave open the question of the classification of *Prolapsus* above the family level. *Prolapsus* was placed in the infraorder Franimorpha by Wood (1975) and in the suborder Sciurognathi by Korth (1984). This is a problem beyond the scope of this paper, the purpose of which is to supplement the knowledge of the geographic and stratigraphic range of *Prolapsus* and to describe the complete upper and lower dentitions based on skull and jaw fragments collected since 1973.

ACKNOWLEDGEMENTS

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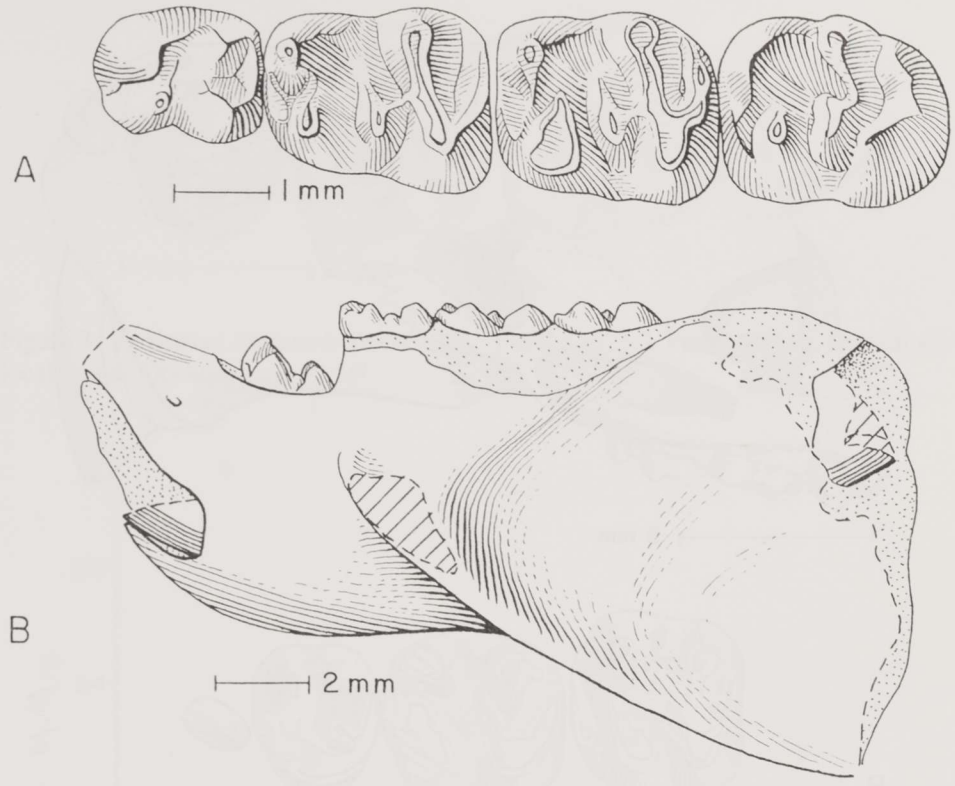

Figure 1. *Prolapsus sibilatoris* Wood 1973, TMM 41672-106, Purple Bench, Serendipity local fauna. A. occlusal view. B. lateral view of left ramus.

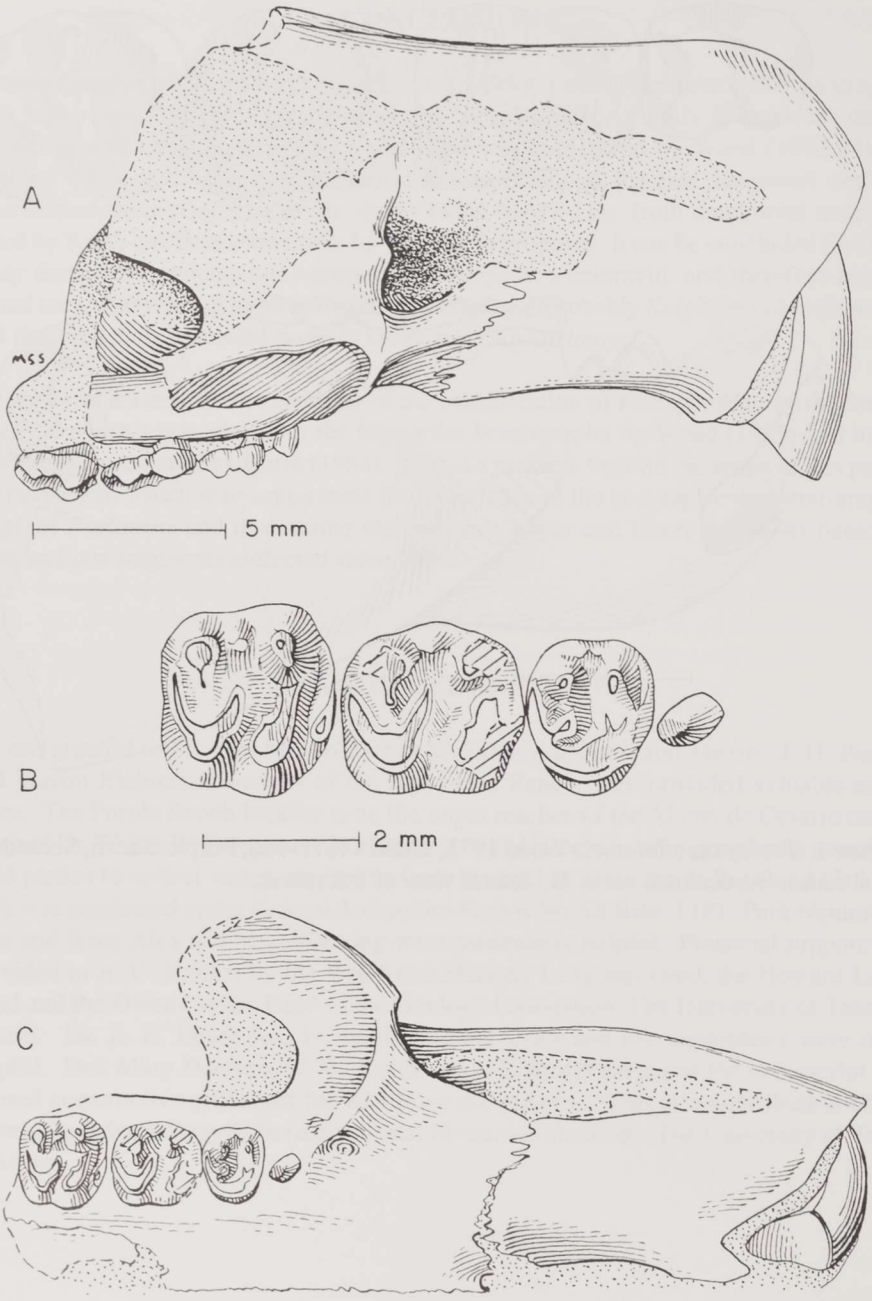

Figure 2. *Prolapsus sibilatoris* Wood 1973. TMM 41672-11, Purple Bench, Serendipity local fauna. A. lateral view of right side of skull fragment. B. occlusal view of P^3-M^2. C. palatal view of skull fragment.

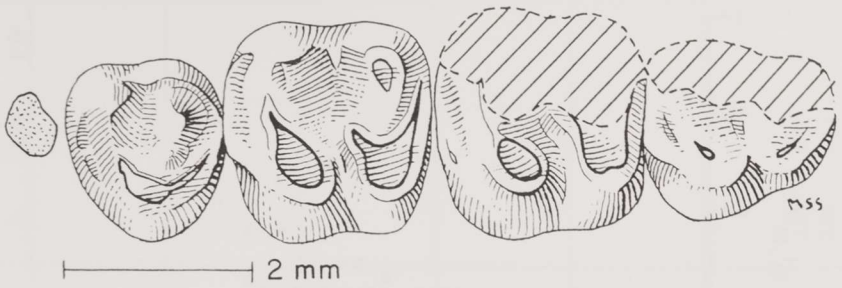

Figure 3. *Prolapsus sibilatoris* Wood 1973. TMM 41672-3, Purple Bench, Serendipity local fauna. Occlusal view P^4-M^3.

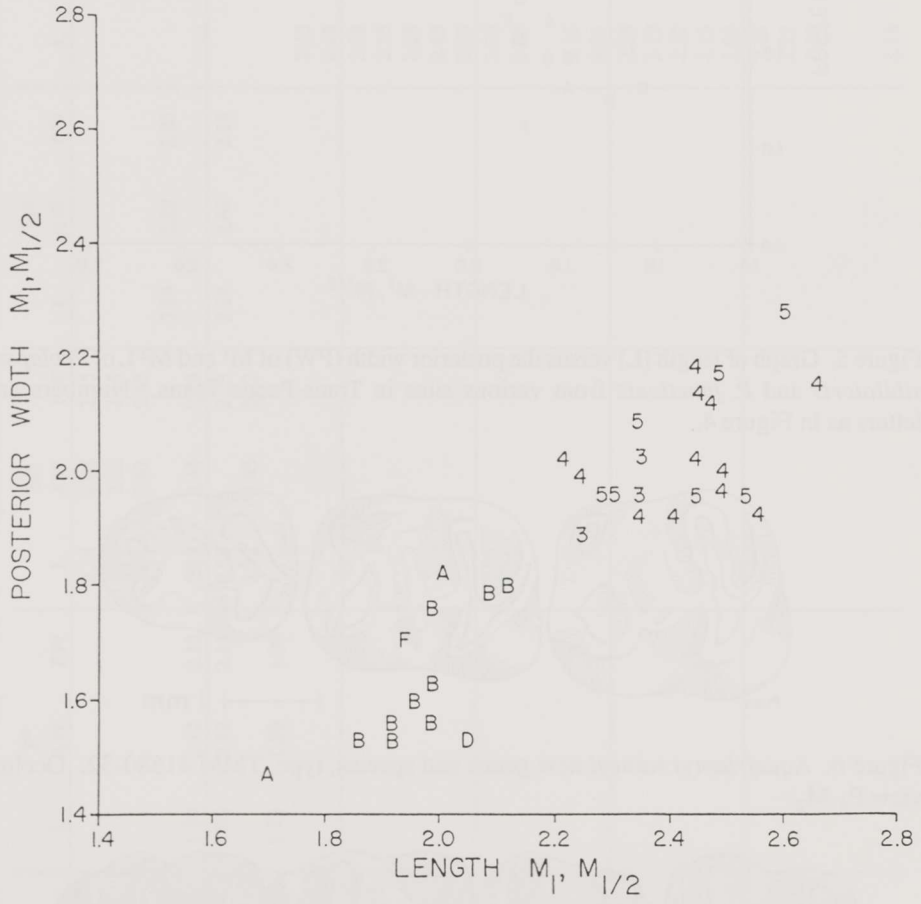

Figure 4. Graph of the length (L) versus the posterior width (PW) of M_1 and M_2 of *Prolapsus sibilatoris* and *P. junctionis* from various sites in Trans-Pecos Texas. *P. junctionis* in capital letters, *P. sibilatoris* in numerals. Localities: A-1, 41444, 42953, basal Tertiary conglomerate; B-2, 41443, basal Tertiary conglomerate; C-3, 41372, Whistler Squat quarry; D-4, 41745, Serendipity quarry; E-5, 41672, Purple Bench; F-6, 42952, Dogie Mountain.

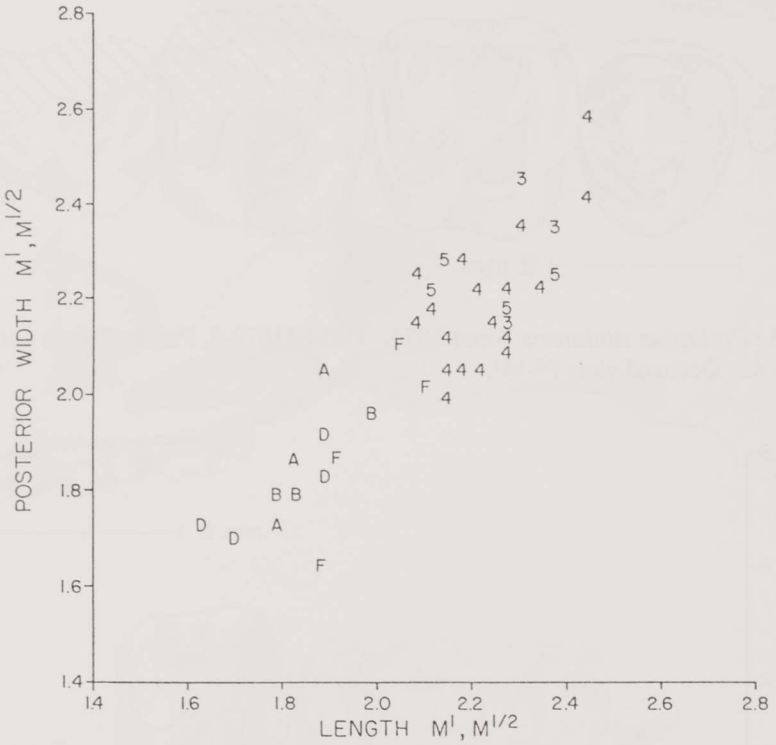

Figure 5. Graph of length (L) versus the posterior width (PW) of M^1 and M^2 L of *Prolapsus sibilatoris* and *P. junctionis* from various sites in Trans-Pecos Texas. Numbers and letters as in Figure 4..

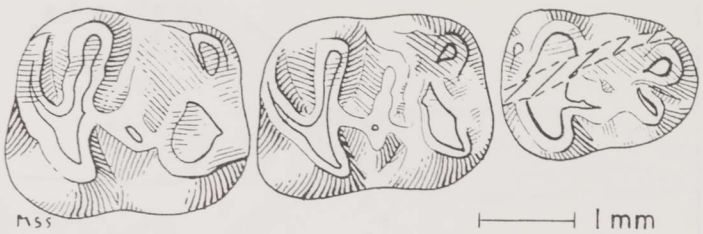

Figure 6. *Aquafriamys raineyi* new genus and species, type, TMM 41580-32. Occlusal view P_4-M_2.

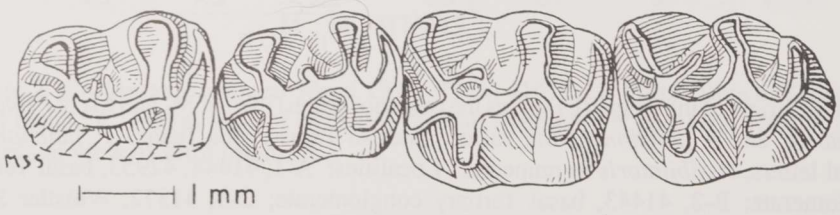

Figure 7. *Yoderimys yarmeri* new species, type, TMM 42153-2. Occlusal view P_4-M_3.

Table 1. Measurements of upper teeth of *Prolapsus sibilatoris* Wood from various sites in Trans-Pecos Texas.

	P^4			M^1			M^2			$M^{1 \text{ or } 2}$			M^3		
	L	AW	PW	L	AW	PW	L	AW	PW	L	AW	PW	L	AW	PW
41372-256				2.38	2.48	2.35									
41372-285				2.28	2.22	2.15									
41372-300				2.31	2.61	2.45									
41372-295							2.18	2.28	2.05						
41672-3 R	1.79	2.12	2.12	2.15	2.45	2.28									
41672-3 L	1.86	2.12	2.15	2.38		2.25	2.28	2.61	2.18						
41672-93				2.12	2.45	2.22									
41745-40	1.73	1.89	1.99												
41745-31										2.45	2.58	2.58			
41745-60										2.18	2.12	2.05			
41745-147										2.28	2.28	2.08			
41745-282										2.15	2.22	2.12			
41745-283										2.28	2.28	2.12			
41745-284										2.45	2.51	2.41			
41745-285										2.09	2.28	2.15			
41745-286										2.35	2.45	2.22			
41745-289										2.28	2.28	2.22			
41745-290												1.92			
41745-292										2.15	2.18	1.99			
41745-294										2.31	2.28	2.35			
41745-295										2.25	2.35	2.15			
41745-297										2.12	2.18	2.18			
41745-298										2.22	2.28	2.05			
41745-299										2.15	1.96	2.05			
41745-300										2.09	2.25	2.25			
41745-301										2.28	2.28	2.22			
41745-302										2.22	2.28	2.22			
41745-303										2.18	2.28	2.28			
41745-305													2.28	2.12	1.79
41549-3													2.15	2.12	1.96
42953-6										2.18	2.58	2.28			

Table 2. Statistics on upper teeth of *Prolapsus sibilatoris* Wood from various sites in Trans-Pecos Texas.

		P^4	M^1	M^2	$M^{1/2}$	M^3
L	n	3	6	2	20	2
	x	1.79	2.27	2.23	2.23	2.22
	SD		0.112		0.104	
	V(%)		4.94		4.66	
AW	n	3	5	2	20	2
	x	2.04	2.44	2.45	2.30	2.12
	SD		0.141		0.148	
	V(%)		5.76		6.43	
PW	n	3	6	2	21	2
	x	2.09	2.28	2.12	2.19	1.88
	SD		0.105		0.149	
	V(%)		4.60		6.80	

Table 3. Measurements of lower teeth of *Prolapsus sibilatoris* Wood from various sites in Trans-Pecos Texas.

	P_4			M_1			M_2			$M_{1 \text{ or } 2}$			M_3		
	L	AW	PW	L	AW	PW	L	AW	PW	L	AW	PW	L	AW	PW
41372-179				2.35	1.99	2.22	2.45	2.25	2.45				2.93	2.18	2.25
41372-299			1.59												
41372-284				2.35	1.76	1.96									
41372-266							2.25	1.86	1.89						
41372-143													2.61	1.96	1.73
41372-265													2.67	2.05	1.86
41372-269													2.61	1.96	2.18
41372-381													2.93	2.12	2.05
41672-8	1.96	1.24	1.96	2.54	1.83	1.96									
41672-9				2.35	1.79	2.09	2.54	2.12	2.18						
41672-14				2.31	1.73	1.96									
41672-15							2.45	1.79	1.96						
41672-85				2.48	1.83	2.12									
41672-106				2.45	1.79	1.96	2.38	2.12	2.18				2.58	2.15	2.02
41672-198	2.28	1.30	1.70	2.61	1.79	2.28	2.61	2.15	2.12						
41745-84	1.92	1.27	1.53												
41745-272				2.25	1.53	1.92									
41745-273													2.54	2.09	2.02
41745-277							2.38	1.76	2.09						
41745-316													3.19	2.12	2.22
41745-371													2.61	1.83	1.63
41745-89										2.22	1.86	2.02			
41745-142										2.61	1.96	2.35			
41745-278										2.45	1.63	1.96			
41745-307										2.45	2.02	2.18			
41745-308										2.45	1.99	2.02			
41745-310										2.25	1.79	1.99			
41745-314										2.55	1.70	1.92			
41745-315										2.45	2.12	2.18			
41745-317										2.41	1.66	1.92			
41745-318										2.48	2.02	2.12			
41745-319										2.41	2.12	1.96			

Table 4. Statistics on lower teeth of *Prolapsus sibilatoris* Wood from various localities in Trans-Pecos Texas.

		P_4	M_1	M_2	$M_{1/2}$	M_3
L	n	3	10	6	11	9
	x	2.05	2.39	2.47	2.42	2.74
	SD		0.121	0.091	0.129	0.222
	V(%)		5.08	3.68	5.33	8.12
AW	n	3	10	6	11	9
	x	1.27	1.79	2.03	1.90	2.05
	SD		0.116	0.204	0.179	0.113
	V(%)		6.46	10.07	9.42	5.53
PW	n	4	10	6	11	9
	x	1.73	2.04	2.16	2.03	2.00
	SD		0.134	0.162	0.101	0.21
	V(%)		6.57	4.49	4.98	10.86

Table 5. Measurements of upper teeth of *Prolapsus junctionis* Wood from various localities in Trans-Pecos Texas.

	P^4			M^1			M^2			$M^{1 \text{ or } 2}$			M^3			dP^4		
	L	AW	PW	L	AW	PW	L	AW	PW	L	AW	PW	L	AW	PW	L	AW	PW
41444-26	1.40	1.76	1.56															
41444-69										1.89	2.02	2.05						
41444-104				1.79	1.66	1.73												
41444-115				1.83	1.96	1.86												
41444-25							1.83	1.89	1.79									
41444-164									1.73									
41444-168							1.86	1.96	1.92									
41443-434										1.99	2.05	1.96						
41443-529										1.86	2.02	1.79						
41443-545																1.63	1.63	1.63
41443-560																1.66	1.60	1.60
41443-66				1.83	1.89	1.79												
41443-54							1.79	1.86	1.79									
41443-65							1.96	1.86	1.99									
41443-73							1.96	1.96	1.92									
41443-74							1.86	1.76	1.73									
41443-78							2.05	2.09	2.02									
41443-215							1.92	1.96	1.70									
41443-324							1.96	1.86	1.76									
41443-396							1.96	2.22	2.12									
41443-542							1.83	1.96	1.86									
41443-445													1.99	2.02	1.96			
41745-72				1.89	1.96	1.83												
41745-136										1.63	1.76	1.73						
41745-269				1.89	2.09	1.92												
41745-270				1.70	1.76	1.70												
41745-110							1.76	1.56	1.73									
41745-266							1.79	1.83	1.79									
41745-267							1.76	1.53	1.70									
42952-67				1.92	1.91	1.85												
42952-68				2.10	1.94	2.01												
42952-69				2.08	2.00	2.11												
42952-70				1.89	1.59	1.62												
42952-71							2.09	1.85	1.80									
42952-72							1.98	2.11	1.85									

Table 6. Statistics on upper teeth of *Prolapsus junctionis* Wood from various sites in Trans-Pecos Texas.

		dP^4	P^4	M^1	M^2	$M^{1/2}$	M^3
L	n	2	1	10	16	4	1
	x	1.65	1.40	1.89	1.90	1.84	1.99
	SD			0.122	0.102		
	V(%)			6.61	5.38		
AW	n	2	1	10	16	4	1
	x	1.62	1.76	1.88	1.89	1.96	2.02
	SD			0.157	0.179		
	V(%)			8.38	9.46		
PW	n	2	1	10	17	4	1
	x	1.62	1.56	1.84	1.84	1.88	1.96
	SD			0.145	0.122		
	V(%)			7.92	6.64		

Table 7. Measurements of lower teeth of *Prolapsus junctionis* Wood from various sites in Trans-Pecos Texas.

	P_4			M_1			M_2			$M_{1 \text{ or } 2}$			M_3		
	L	AW	PW	L	AW	PW	L	AW	PW	L	AW	PW	L	AW	PW
41444-1	1.66	1.30	1.56												
41444-62				2.01	1.63	1.82									
41444-116				1.70	1.30	1.47									
41444-59							2.41	1.79	1.66						
41444-75													2.02	1.70	1.70
41443-363	1.60	1.04	1.37												
41443-433	1.63	1.34	1.56												
41443-33				1.99	1.47	1.63									
41443-68				1.92	1.43	1.56									
41443-71				1.86	1.30	1.53									
42952-103	1.98	1.41	1.68												
41443-75				2.05	1.53	1.79									
41443-141				1.92	1.40	1.53									
41443-222				1.96	1.40	1.60									
41443-371				1.99	1.53	1.76									
41443-381				2.09	1.63	1.79									
41443-417				2.12	1.73	1.80									
41443-491							1.99	1.30	1.56						
41443-496							2.15	1.70	1.86						
41443-507							2.02	1.70	1.86						
41443-557							2.02	1.70	1.92						
41443-566							2.05	1.92	1.73						
41745-471				2.05	1.50	1.53									
41745-472						1.27									
41745-322									1.47						
41745-276													2.38	1.83	1.66
41745-279													2.45	1.79	1.47
41745-280													2.28	1.60	1.73
42952-82				1.93	1.45	1.70									
42952-81							2.09		1.82						

Table 8. Statistics on lower teeth of *Prolapsus junctionis* from various sites in Trans-Pecos Texas.

		P_4	M_1	M_2	M_3
L	n	4	13	7	4
	x	1.72	1.97	2.10	2.28
	SD		0.109	0.145	
	V(%)		5.56	6.89	
AW	n	4	13	6	4
	x	1.27	1.48	.69	1.73
	SD		0.127	0.207	
	V(%)		8.56	12.31	
PW		4	14	8	4
		1.54	1.63	1.74	.64
			0.159	0.160	
			9.78	9.22	

Table 9 a., b., c. Measurements and statistics of various eomyids.

a. *Yoderimys*

	P_4-M_3	P_4			M_1			M_2			M_3		
		L	AW	PW	L	AW	PW	L	AW	PW	L	AW	PW
Y. bumpi													
SDSM 5330 (TYPE)	7.51	2.05	1.43	1.73	1.97	1.60	1.75	1.94	1.73	1.80	1.83	1.55	1.43
SDSM 5325		1.96	1.37	1.66	1.90	1.46	1.57	1.92	1.64	1.68			
SDSM 5326		1.87	1.32	1.53				1.82	1.76	1.81			
Y. burkei													
CM 9782		2.3	1.7	2.0	2.3	1.8	1.9	2.3	2.0	2.0			
FMNH PM 404	7.80	2.02	1.35	1.65	1.85			1.78					
Y. lustrorum													
FMNH PM 426		1.6			1.6			2.0	1.71	1.64			
FMNH PM 432	6.9	1.82	1.12	1.32	1.76	1.48	1.57	1.76	1.63	1.60			
Y. yarmeri *n.g. n.sp.*													
TMM 42153-2 (TYPE)	9.00	2.30			2.21	1.90	1.80	2.30	2.10	2.00	2.60	2.10	1.90
TMM 42019-10					2.10	1.80	1.90	2.10	2.00	1.90	2.70	2.10	2.00

b. ***Aguafriamys raineyi*** n.g. n.sp.

	P_4		M_1		M_2	
	L	W	L	W	L	W
TMM 41580-32 (TYPE)	2.00	1.80	2.50	2.20	2.60	2.40

c. *Yoderimys stewarti* Calf Creek Storer (1978)

	P_4			$M_{1 \text{ or } 2}$		
	L	AW	PW	L	AW	PW
M	2.24	1.60	1.99	1.99	1.70	1.78
OR	2.12-2.34	1.50-1.89	1.84-2.38	1.70-2.15	1.48-1.88	1.54-1.92
CV		9.38	11.06	6.53	7.60	6.74
X	4	6	5	11	9	9

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TEXAS MEMORIAL MUSEUM
The University of Texas at Austin
2400 Trinity Street, Austin, TX 78705
(512) 471-1604